

Chapter 1

Meeting Google SketchUp

In This Chapter

- ▶ Finding out why it's free from Google
 - ▶ Comparing SketchUp with other 3D software
 - ▶ Finding out what you can and can't do with SketchUp
 - ▶ Looking around the application
-

Once upon a time, software for building three-dimensional (3D) models of things like buildings, cars, and other stuff was hard to use. I mean *really* hard — people went to school for years to learn it. And if that wasn't bad enough, 3D modeling software was expensive — so expensive that the only people who used it were professionals and software pirates (people who stole it, basically). Then along came SketchUp.

Operating under the assumption that lots of people may want — and need — to make 3D models, the folks who invented SketchUp decided to design a program that worked more intuitively. Instead of making you think about 3D models as complex mathematical constructs (the way computers think), they created an interface that lets you build models using elements you're already familiar with: lines and shapes.

So do you need to know how to draw to use SketchUp? In the latest version of the software, not really. Traditional drawing is about *translating* what you see onto a flat piece of paper: going from 3D to 2D, which is hard to do for most people. In SketchUp, you're always in 3D, so no translation is involved — you just *build*, and SketchUp takes care of stuff like perspective and shading for you.

This first chapter is about putting SketchUp in context: why Google offers it for free, how it compares to other 3D software, and what you can (and can't) do with it. In the last part of the chapter, I give a quick tour of the program, just to let you know where things are.

Things You Ought to Know Right Away

Before I continue, here's some information you may need:

- ✓ **You get SketchUp by downloading it from the Internet.** Just type <http://sketchup.google.com> into your Web browser and read through the first page of the Google SketchUp Web site. Click the links to download the application to your computer and then follow the installation instructions on the Web.
- ✓ **SketchUp works in Windows and Mac OS X.** Google SketchUp is available for both operating systems, and it looks (and works) about the same way on both.
- ✓ **A Pro version is available.** Google offers a Pro version of SketchUp (*Google SketchUp Pro*) that you can buy if you need it. The Pro version includes a few terrific features that folks like architects, production designers, and other design professionals need for exchanging files with other software. SketchUp Pro also includes a whole separate application — dubbed *LayOut* — for creating presentation documents with your SketchUp models; it's the subject of Chapters 14 and 15. If you think you may need Pro, you can download a free trial version at <http://sketchup.google.com>.

Where SketchUp Fits in Google's World

A long time ago, somebody invented photography (hey — this isn't a history book), and suddenly people could make pictures of things that didn't involve drawing, engraving, or painting. Nowadays, you can't throw a rock without hitting a photograph of something. *Everything* (it seems) can take pictures, including people's phones. Photography is the main way that visual information is communicated.

But what comes after photography? Google (and just about every science-fiction writer who ever lived) thinks it's 3D, and here's why: You live in 3D. The furniture you buy (or build) is 3D, and so is the route you take to work. Because so many of the decisions you need to make (buying a couch, finding your way) involve 3D information, wouldn't it be nice to experience that information in 3D?

Software like SketchUp lets you see 3D information on a 2D screen, which is good, but affordable 3D printers and holography (yep, holograms) are just over the horizon. All that's left is to build a model of every single thing in the world — and guess who's going to do it?

You. By making SketchUp free for everyone, Google is leading the 3D charge. Rather than relying on a small number of 3D nerds to get around to modeling everything in the universe, Google made SketchUp available to anyone who wants to participate. Sometimes the best way to solve a hard problem (like modeling millions of buildings and other objects) is to get lots and lots of people working on it.

Comparing SketchUp to Other 3D Modeling Programs

If you're reading this book, I presume you're at least interested in two things: building 3D models and using SketchUp to do so. The following sections tell you something about how SketchUp compares to other 3D modeling programs — how long it takes to figure out how to use it and what kind of models it produces.

Jumping right in

When it comes to widely available 3D modeling software, it really doesn't get any easier than SketchUp. This software has been successful for one reason: People can get good enough at SketchUp to build something within a couple hours of launching it for the first time. You have no thick manuals to read, and no special geometric concepts to understand. Modeling in SketchUp is about grabbing your mouse and making something.

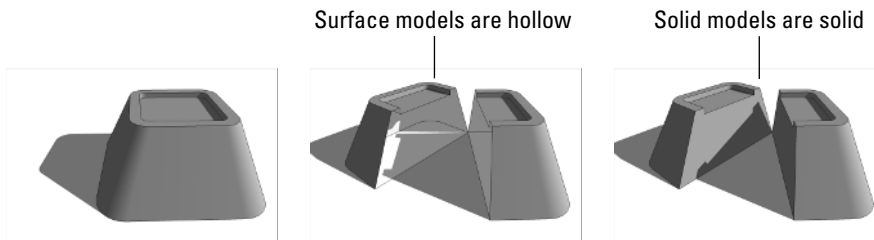
So how long should it take you to discover how SketchUp works? That depends on your background and experience, but in general, you can expect to make something recognizable in less than four hours. That's not to say you'll be a whiz — it just means that SketchUp's learning curve is extremely favorable. You don't need to know much to get started, and you'll still pick up things years from now. In fact, I've discovered a couple things just writing this book.

But is SketchUp *easy*? Lots of people say so, but I think it's all relative. SketchUp is without a doubt easier than any other modeling program I've tried, but 3D modeling itself can be tricky. Some people catch on right away, and some folks take longer. But I can say this for sure: If you want to build 3D models and you have an afternoon to spare, there's no better place to start than SketchUp (and this book of course). Chapter 3 walks you through the basics to help you start modeling in SketchUp quickly.

Understanding the difference between paper and clay

Three-dimensional modeling software comes in two basic flavors: *solids* and *surfaces*. Figure 1-1 and the following points illustrate the difference:

Figure 1-1:
SketchUp
models are
hollow.



- ✓ **SketchUp is a surfaces modeler.** Everything in SketchUp is basically made up of thin (infinitely thin, actually) surfaces — dubbed *faces*. Even things that look thick (like cinder-block walls) are actually hollow shells. Making models in SketchUp is a lot like building things out of paper — really, really thin paper.

Surface modelers like SketchUp are great for making models quickly because all you really need to worry about is modeling what things *look* like. That's not to say that they're less capable; it's just that they're primarily intended for visualization.

- ✓ **Using a solids modeler is more like working with clay.** When you cut a solid model in half, you create new surfaces where you cut; that's because objects are, well, solid. Programs like SolidWorks, form-Z, and Autodesk Inventor create solid models.

People who make parts — like mechanical engineers and industrial designers — tend to work with solid models because they can use them to do some pretty precise calculations. Being able to calculate the volume of an object means that you can figure how much it will weigh, for example. Also, special machines can produce real-life prototypes directly from a solid-model file. These prototypes are handy for seeing how lots of little things are going to fit together.

An important point to reinforce here is that there's no “best” type of modeling software. It all depends on three things: how you like to work, what you're modeling, and what you plan to do with your model when it's done.



Despite what I just said about SketchUp being only a surfaces modeler, one of the niftiest new features in SketchUp Pro 8 (the non-free version of the software) is a set of tools that lets you manipulate special solid objects in your models. The Solid Tools feature offers a whole new way to work in SketchUp — you can read all about it in Chapter 6.



Yet another caveat: When I said (a few paragraphs ago) that 3D modeling programs come in two basic flavors, I sort of lied. The truth is, you can split them into two groups another way: by the kind of math they use to produce 3D models. You can find *polygonal* modelers (of which SketchUp is an example) and *curves-based* modelers. The former type uses straight lines and flat surfaces to define everything — even things that *look* curvy, aren't. The latter kind of modeler uses true curves to define lines and surfaces. These yield organic, flowing forms that are much more realistic than those produced by polygonal modelers, but that put a lot more strain on the computers that have to run them — and the people who have to figure out how to use them. Ultimately, it's a trade-off between simplicity and realism.

What You Should (And Shouldn't) Expect SketchUp to Do

Have you ever been to a hardware store and noticed the multitool gizmos on the racks next to the checkout stands? I once saw one that was a combination screwdriver, pliers, saw, tape measure, and (I swear) hammer. I sometimes wonder whether the hardware store people put them there as a joke, just to make you feel better about standing in line.

I generally don't like tools that claim to do everything. I much prefer *specialists* — tools that are designed for doing one thing *really* well. In the case of SketchUp, that one thing is building 3D models.

Here's a list of things (all model-building-related) that you can do with SketchUp:

- ✓ **Start a model in lots of ways:** With SketchUp, you can begin a model in whatever way makes sense for what you're building:
 - *From scratch:* When you first launch SketchUp, you see nothing except a little person standing in the middle of your screen. If you want, you can even delete him, leaving you a completely blank slate on which to model anything you want.
 - *From a photograph:* The second part of Chapter 8 talks all about how you can use SketchUp to build a model based on a photo of the thing you want to build; it's not really a beginner-level feature, but it's there.



- *With another computer file:* SketchUp can import images that you can use as a starting point for what you want to make. SketchUp Pro can even import CAD (computer-aided drawing) files that give you even more of a head start.
- *From a geo-location snapshot:* If you've ever used Google Earth, you know that Google has amazing aerial imagery and 3D terrain data for the whole world. In SketchUp 8, it's easy to grab a geo-location snapshot (a small chunk of the planet, basically) to use as a site for your model; read all about it in Chapter 11.
- *From Building Maker:* Google has an easy-as-pie, super-specialized tool for modeling real-world structures — Building Maker. You can start a model in Building Maker and modify it in SketchUp 8. If you're modeling existing buildings, this is a great way to save time — read more in Chapter 11.

✓ **Work loose or work tight:** One of my favorite things about SketchUp is that you can model without worrying about exactly *how big* something is. You can make models that are super-sketchy, but if you want, you can also make models that are absolutely precise. SketchUp is just like paper in that way; the amount of detail you add is entirely up to you.

✓ **Build something real or make something up:** *What* you build with SketchUp really isn't the issue. You work only with lines and shapes — or in SketchUp, *edges* and *faces* — so how you arrange them is your business. SketchUp isn't intended for making buildings any more than it is for creating other things. It's just a tool for drawing in three dimensions.

✓ **Share your models:** After you make something you want to show off, you can do a number of things, which you can discover in detail in Part IV:

- *Print:* Yep, you can print from SketchUp.
- *Export images:* If you want to generate an image file of a particular view, you can export one in any of several popular formats.
- *Export movies:* Animations are a great way to present three-dimensional information, and SketchUp can create them easily.
- *Export other 3D model formats:* With the Pro version of SketchUp, you can share your model with other pieces of software to create CAD drawings, generate photorealistic renderings, and more.
- *Upload to the 3D Warehouse:* This is a giant, online repository of SketchUp models. Add (or take) all the models you want.
- *Contribute to Google Earth:* Models you make of actual buildings that are efficient, accurate, and *photo-textured* (painted with photographs of the building itself) are welcome on Google Earth's default 3D Buildings layer. If you like, you can submit your work for consideration; if it's accepted, it goes live in a place where millions of people can see it.

Is this model a toaster or a bungalow?

SketchUp models are made from two basic kinds of *geometry*: edges (which are straight lines) and *faces* (which are 2D surfaces bound by edges). That's it. When you use SketchUp to draw a bunch of edges and faces in the shape of a staircase, all SketchUp knows is how many edges and faces it has to keep track of, and where they all go. There's no such thing as a *stair* in SketchUp — just edges and faces.

That said, the previous version of SketchUp introduced an exciting new development: *Dynamic Components* are pre-programmed objects that know what they are. A dynamic staircase, for example, is smart enough to know that it should add or subtract steps when you make it bigger or smaller. Dynamic Components are a big step for SketchUp; all of a sudden, there's a class of stuff in the

program that has (what software types would call) *intelligence*. What's that mean for you? For starters, SketchUp is easier to pick up than it's ever been. I go on and on about Dynamic Components in Chapter 5.

With the exception of Dynamic Components, though, things in SketchUp don't have any idea what they're supposed to represent. Coming to this realization has the tendency to freak out some people. If you want a model of something, you have to make it out of edges and faces. The thing to remember is that SketchUp was created to let you model *anything*, not just buildings, so its tools are designed to manipulate geometry. That's good news, believe it or not, because you're not restricted in any way; you can model anything you can imagine.

What *can't* SketchUp do? A few things, actually — but that's okay. SketchUp was designed from the outset to be the friendliest, fastest, and most useful modeler available — and that's it, really. Fantastic programs are available that do the things in the following list, and SketchUp can exchange files with most of them:

- ✓ **Photorealistic rendering:** Most 3D modelers have their own, built-in photo renderers, but creating model views that look like photographs is a pretty specialized undertaking. SketchUp has always focused on *non-photorealistic rendering (NPR)* instead. NPR (as it's known) is essentially technology that makes things look hand-drawn — sort of the opposite of photorealism. If you want to make realistic views of your models, I talk about renderers that work great with SketchUp in Chapter 17.
- ✓ **Animation:** A few paragraphs ago, I mention that SketchUp can export animations, but that's a different thing. The movies that you can make with SketchUp involve moving your “camera” around your model. True animation software lets you move things around *inside* your model. SketchUp doesn't do that, but the Pro version lets you export to a number of different programs that do.

Taking the Ten-Minute SketchUp Tour

The point of this portion of the chapter is to show you where everything is — kind of like the way a parent shows a new babysitter around the house before leaving for a couple hours. Here I don't explain what anything *does*, per se. I just want you to feel like you know where to start looking when you find yourself hunting around for something.

Just like most programs you already use, SketchUp has five main parts. Figure 1-2 shows them all, in both the Windows and Mac versions of the program. I describe these parts, plus an additional feature, in the following list:

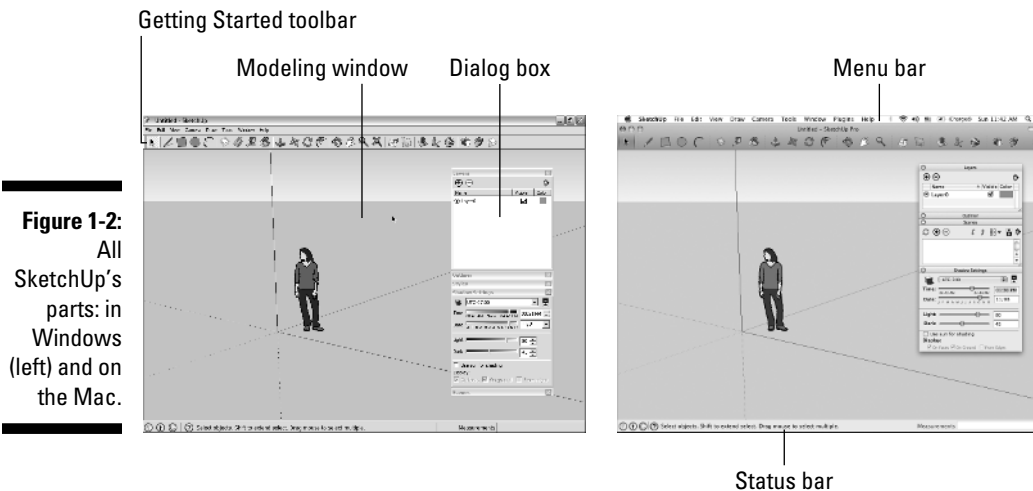


Figure 1-2:
All
SketchUp's
parts: in
Windows
(left) and on
the Mac.

- ✓ **Modeling window:** See the big area in the middle of your computer screen? That's your modeling window, and it's where you spend 99 percent of your time in SketchUp. You build your model there; it's sort of a frame into a 3D world inside your computer. What you see in your modeling window is *always* a 3D view of your model, even if you happen to be looking at it from the top or side.
- ✓ **Menu bar:** For anyone who has used a computer in the last 30 years, the menu bar is nothing new. Each menu contains a long list of options, commands, tools, settings, and other goodies that pertain to just about everything you do in SketchUp.
- ✓ **Toolbars:** These contain buttons that you can click to activate tools and commands; they're faster than using the menu bar. SketchUp has a few toolbars, but only one is visible when you launch it the first time: the Getting Started toolbar.



If your modeling window is too narrow to show all the tools on the Getting Started toolbar, you can click the arrow on the right to see the rest of them.

- ✓ **Dialog boxes:** Some programs call them palettes and some call them inspectors; SketchUp doesn't call them anything. Its documentation (the SketchUp Help document you can get to in the Help menu) refers to some of them as managers and some as dialog boxes, but I thought I'd keep things simple and just call them all the same thing: dialog boxes.
- ✓ **Status bar:** You can consider this your SketchUp dashboard, I suppose. The status bar contains contextual information you use while you model.
- ✓ **Context menus:** Right-clicking things in your modeling window usually causes a context menu of commands and options to open. These are always relevant to whatever you happen to right-click (and whatever you're doing at the time), so the contents of each context menu are different.



Although the following items aren't part of the SketchUp user interface (like all the stuff in the preceding list), they're a critical part of modeling in SketchUp:

- ✓ **A mouse with a scroll wheel:** You usually find a left button (the one you use all the time), a right button (the one that opens the context menus), and a center *scroll wheel* that you both roll back and forth and click down like a button. You should get one if you don't already have one — it'll improve your SketchUp experience more than any single other thing you can buy.
- ✓ **A keyboard:** This sounds silly, but some people have tried to use SketchUp without one; it's just not possible. So many of the things you need to do all the time (such as make copies) involve your keyboard, so you'd better have one handy if you plan to use SketchUp.

Hanging out at the menu bar

SketchUp's menus are a pretty straightforward affair; you won't find anything surprising like "Launch Rocket" in any of them, unfortunately. All the same, here are the menus:

- ✓ **File:** Includes options for creating, opening, and saving SketchUp files. The File menu is also where to go if you want to import or export a file, or make a printout of your model view.
- ✓ **Edit:** Has all the commands that affect the bits of your model that are selected.
- ✓ **View:** This one's a little tricky. You'd think it'd contain all the options for flying around in 3D space, but it doesn't — that stuff's on the Camera menu. Instead, the View menu includes all the controls you use to affect

the appearance of your model itself: what's visible, how faces look, and so on. View also contains settings for turning on and off certain elements of SketchUp's user interface.

- ✓ **Camera:** Contains controls for viewing your model from different angles. In SketchUp, your “camera” is your point of view, literally.
- ✓ **Draw:** Includes tools for drawing edges and faces in your modeling window.
- ✓ **Tools:** Most of SketchUp's tools are contained here, except of course for the ones you use for drawing.
- ✓ **Window:** If you're ever wondering where to find a dialog box you want to use, this is the place to look; they're all right here.
- ✓ **Plugins:** You can get extra tools for SketchUp — little programs that “plug in” to it and add functionality. Some of them show up here after they're installed. Chapter 17 introduces a few of my favorites.
- ✓ **Help:** When you're stuck, and this book isn't helping (heaven forbid), check out the Help menu; it's the gateway to SketchUp salvation.

Checking the status bar

The narrow strip of information below the modeling window is packed with information goodness:

- ✓ **Context-specific instructions:** Most of the time, you check here to see what options may be available for whatever you're doing. *Modifier keys* (keyboard strokes that you use in combination with certain tools to perform additional functions), step-by-step instructions, and general information about what you're doing all show up in one place: right here.
- ✓ **The Measurements box:** The Measurements box is where numbers show up (to put it as simply as I can). Chapter 2 goes into more detail, but the basic purpose of the Measurements box is to enable you to be precise while you model.
- ✓ **Status indicator icons:** These three little icons appear in the lower-left corner of your screen. They change to tell you things about your model, and you can click them to find out what they do. The most important one to note (this early on in your SketchUp tutelage) is the one that looks like a question mark. When you click this icon, it opens the Instructor dialog box, which contains information about the tool you're currently using.





Where are all the tools?

The Getting Started toolbar contains a small subset of the tools that you can use in SketchUp. The thinking (which I agree with, incidentally) is that seeing all the tools right away tends to overwhelm new users, so having a limited selection helps people.

To get access to more tools (through toolbars, anyway — you can always access everything through the menus), you do different things, depending on which operating system you use:

✓ **Windows:** Choose View⇨Toolbars. The mother lode! I recommend starting off with

the Large Tool Set to begin with and then adding toolbars as you need them (and as you figure out what they do).

✓ **Mac:** Choose View⇨Tool Palettes⇨Large Tool Set. To add even more tools, right-click the Getting Started toolbar (the one right above your modeling window) and choose Customize Toolbar. Now drag whatever tools you want onto your toolbar and click the Done button.

Taking a peek at the dialog boxes

Most graphics programs have a ton of little controller boxes that float around your screen, and SketchUp is no exception. After the dialog boxes are open, you can “dock” them together by moving them close to each other, but most people I know end up with them all over the place — me included. Dialog boxes in SketchUp contain controls for all kinds of things; here are the ones that I think deserve special attention:

✓ **Preferences:** While the Model Info dialog box (see the next point) contains settings for the SketchUp file you have open right now, the Preferences dialog box has controls for how SketchUp behaves *no matter what* file you have open. Pay particular attention to the Shortcuts panel, where you can set up keyboard shortcuts for any tool or command in the program.

On the Mac, the Preferences dialog box is on the SketchUp menu, which doesn’t exist in the Windows version of SketchUp.

Some changes to the Preference settings don’t take effect until you open another file or restart SketchUp altogether, so don’t worry if you can’t see a difference right away.



- ✓ **Model Info:** This dialog box is, to quote the bard, the mother of all dialog boxes. It has controls for everything under the sun; you should definitely open it and take your time going through it. Chances are, the next time you can't find the setting you're looking for, it's in Model Info.
- ✓ **Entity Info:** This little guy is small, but it shows information about *entities* — edges, faces, groups, components, and lots of other things — in your model. Keeping it open is a good idea because it helps you see what you've selected.
- ✓ **Instructor:** The Instructor does only one thing: It shows you how to use whatever tool happens to be activated. While you're discovering SketchUp, keep the Instructor dialog box open off to the side. You can also open it at any time by clicking the little ? icon in the status bar, at the bottom of your screen.